

Exam 2 (Part I)

Wednesday, March 26, 2014

Name: _____

This is the in-class portion of Exam 2. This is a closed-book and closed-notes exam; you may consult only the “Special Distributions” handout.

Show all significant work and give reasons for all your answers. Use your own paper and/or the paper provided by the instructor. You have up to 50 minutes to work on the following 2 questions. Relax.

1. Assume that a random variable, X , has moment generating function

$$\psi_X(t) = \frac{e^{-t}}{1-t}, \quad \text{for } t < 1.$$

- (a) Compute the expected value of X and the second moment of X .
- (b) Compute $\text{Var}(X)$.

2. A random vector, (X, Y) , has joint probability density function given by

$$f_{(X,Y)}(x, y) = \begin{cases} e^{-2y}, & \text{for } 0 < x < 2 \text{ and } y > 0; \\ 0, & \text{elsewhere.} \end{cases}$$

- (a) Compute $\Pr(X + Y < 1)$.
- (b) Find the marginal distribution of X and compute $E(X)$.

(Bonus) For the random variable X in Problem 1,

- (a) determine the distribution of X ;
- (b) compute $\Pr(X \leq 0)$.